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EXAMINER	
ZERVIGON, RUDY	

ART UNIT	PAPER NUMBER
1763	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/722,485	Applicant(s) NARUSHIMA, MASAKI	
	Examiner Rudy Zervigon	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 November 0200* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13 and 16-22* is/are rejected.

7)☒ Claim(s) *14 and 15* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *2* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 3's statement "and each penetration passage portions made in one of walls" is grammatically incorrect.

3. Claim 16 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 16's statement "irregularity surface" is grammatically incorrect.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 10, 12, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Logan et al (USPat. 5,155,652). Logan et al teaches :

1. A ceramic (column 4, lines 41-48) heater system (Figure 1) comprising: a ceramic heater base (50/52, Figure 1; column 3, lines 32-53) having a substrate mounting surface formed on a top surface (42, Figure 1) thereof; a heater (54, Figure 1; column 3, lines 30-50), buried (column 4, lines 28-49) in the heater base, for heating a substrate (23, Figure 1); and a fluid passage (33-35, Figure 1) provided in the heater base (after bonding – column 4, lines 28-49) below the heater, whereby the heater base is cooled by letting a fluid (column 4, lines 1-13) flow in the fluid passage.

10. The ceramic heater system (Figure 1) according to claim 1, wherein the heater (54, Figure 1; column 3, lines 30-50) is formed of graphite (column 3, line 38) shaped in such a pattern as to evenly generate heat in the heater base.

12. The ceramic heater (54, Figure 1; column 3, lines 30-50) system (Figure 1) according to claim 1, further comprising: an electrode (46, Figure 1) buried in the heater base above the heater; and a DC power (column 2, line 65 – column 3, line 5) supply for applying a DC voltage to the electrode; whereby applying the DC voltage to the electrode causes the substrate mounted on the mounting surface to be electrostatic ally chucked.

18. A ceramic heater system comprising an upper heater base (52, Figure 1) of ceramics (3, lines 34-45) having a substrate mounting surface formed on a top surface thereof and a groove (78) formed at a bottom surface to serve as a fluid passage; a lower heater base (62) of ceramics (column 3, lines 45-60) closely adhered to a bottom side of the upper heater base, thereby making the groove airtight (column 3, line 65 – column 4, line 5); and a heater (54), buried in the upper heater base, for heating a substrate, whereby the heater base is cooled by a fluid (column 4, lines 5-10)

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 2-6, 9, 11, 17, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Logan et al (USPat. 5,155,652) as applied to claims 1, 10, 12, and 18 above, and further in view of Manabu Edamura (JP407337630A). Logan teaches - 5. The ceramic heater wherein the fluid which flows in the fluid passage is at least one gas selected from Ar, He, Ne and N2 gases or a mixed gas thereof (column 4, lines 1-13). Logan also teaches - 11. The ceramic heater system according to claim 9, wherein the heater has glassy boron nitride (column 3, lines 32-40) coated on an outer surface of graphite of which the heater is formed (column 3, line 38). 5. - The ceramic heater wherein the fluid which flows in the fluid passage is at least one gas selected from Ar, He, Ne and N_2 gases or a mixed gas thereof (column 4, lines 5-10).

Logan et al does not teach:

2. The ceramic heater system according to claim 1, wherein the fluid passage has a plurality of concentric circular passage portions and a plurality of penetration passage portions connecting the circular portions passage, and any adjacent two of the penetration passage portions are not aligned in a radial direction

3. The ceramic heater system according to claim 2, wherein the penetration passage portions connecting any two adjacent circular portions are arranged at regular intervals along either

circular portion, and each penetration passage portions made in one of walls defining a circular portion opens to that part of the other wall of the circular portion, which is located between two adjacent penetration passage portions made in the other wall of the circular portion

4. The ceramic heater system, wherein the fluid passage has a fluid inlet in a lower portion of the heater base and fluid outlets at end portions of the heater base.

9. The ceramic heater system according to claim 1, wherein the heater has a high-melting-point metal patterned in such a coil form as to evenly generate heat in the heater base and two zones

17. The ceramic heater system according to claim 2, wherein the fluid passage has a fluid inlet formed in a lower portion of the heater base and a plurality of fluid outlets formed through circumferential side walls of the heater base.

Manabu Edamura teaches:

1. An electrostatic chuck (3, abstract): a fluid passage (7, abstract; Figure 7) provided in the chuck base whereby the base is cooled by letting a fluid (helium and argon; abstract) flow in the fluid passage

2. An electrostatic chuck wherein the fluid passage has a plurality of concentric circular passage portions (7, abstract; Figure 7) and a plurality of penetration passage portions (3, abstract; Figure 7) connecting the circular portions passage, and any adjacent two of the penetration passage portions are not aligned in a radial direction – see Figure 7 and compare with Applicant's Figure 2.

3. An electrostatic chuck wherein the penetration passage portions connecting any two adjacent circular portions are arranged at regular intervals (see cross section – Figure 1, 3, 4) along either circular portion, and each penetration passage portions made in one of walls defining a circular

portion opens to that part of the other wall of the circular portion, which is located between two adjacent penetration passage portions made in the other wall of the circular portion – see Figure 1, 3, and 4 and compare with Applicant's Figure 2.

5. The ceramic heater wherein the fluid which flows in the fluid passage is at least one gas selected from Ar, He, Ne and N2 gases or a mixed gas thereof (abstract).

Manabu Edamura does not teach:

4. The ceramic heater system, wherein the fluid passage has a fluid inlet (34) in a lower portion of the heater base and fluid outlets at end portions of the heater base.

9. The ceramic heater system according to claim 1, wherein the heater has a high-melting-point metal patterned in such a coil form as to evenly generate heat in the heater base and two zones

17. The ceramic heater system according to claim 2, wherein the fluid passage has a fluid inlet formed in a lower portion of the heater base and a plurality of fluid outlets formed through circumferential side walls of the heater base.

20. Wafer temperature control in a chamber (1, Figure 1) whose interior can be kept in a vacuum state (Title) by an exhaust system (2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Logan to implement the cooling fluid conduit arrangement of Manabu Edamura.

Motivation for Logan to implement the cooling fluid conduit arrangement of Manabu Edamura is drawn to controlling "temperature distribution" (Purpose) enabling "semiconductor finer in size and higher in performance can be manufactured" (Constitution).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Logan to implement a high-melting point metal material other than the pyrolitic graphite.

Motivation for Logan to implement a high-melting point metal material other than the pyrolitic graphite is drawn to the level of ordinary skill in the art where alternative heating materials with high melting points are common for the heating element of Logan.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Manabu Edamura to locate the fluid passage with a fluid inlet formed in a lower portion of the chuck base and a plurality of fluid outlets formed through circumferential side walls of the chuck base.

Motivation for Manabu Edamura to locate the fluid passage with a fluid inlet formed in a lower portion of the chuck base and a plurality of fluid outlets formed through circumferential side walls of the chuck base is drawn to maintaining flow direction and forced convection to accomplish the stated objectives of wafer temperature control.

8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Logan et al (USPat. 5,155,652) and Manabu Edamura (JP407337630A), as applied to claims 2-6, 9, 11, 17, 19, and 20 above, and further in view of Arasawa et al (USPat. 5,547,539). Logan and Manabu Edamura do not teach:

7. The ceramic heater system according to claim 1, wherein a ratio of H_2 flow rate to Ar flow rate is 20% or more.

Arasawa et al teaches:

7. The ceramic heater system wherein a ratio of H_2 flow rate to Ar flow rate is controllable (27b, 28b, Figure 1; column 5, lines 13-21)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the independent gas control of Arasawa et al as part of the Logan et al apparatus. Motivation for implementing the independent gas control of Arasawa et al as part of the Logan et al apparatus is drawn to the teachings of Arasawa et al – "increase the efficiency of cooling an object" (column 2, line 25).

9. Claims 8 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Logan et al (USPat. 5,155,652) and Manabu Edamura (JP407337630A), as applied to claims 2-6, 9, 11, 17, 19, and 20 above, and further in view of Fuji et al (USPat. 6,135,052). Logan et al does not teach means for temperature adjustment of the fluid coolant from a heat exchanger when controlling wafer temperature. Fuji et al teaches wafer temperature control with means for temperature adjustment of the fluid coolant by a heat exchanger (item 4, Figure 1; claim 1; column 2, lines 47-52) thereby imparting temperature control of a wafer. Fuji et al also teaches a showerhead with associated process gas supply (column 3, lines 60-65).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the Fuji wafer temperature control means for temperature adjustment of the fluid coolant.

Motivation for implementing the Fuji wafer temperature control means for temperature adjustment of the fluid coolant is dawn to Fuji's motivation for "etching can be carried out in high accuracy" (column 3, lines 25-31).

10. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Logan et al (USPat. 5,155,652) and Manabu Edamura (JP407337630A), as applied to claims 2-6, 9, 11, 17, 19, and 20 above, and further in view of Ameen et al (USPat. 6,143,128). Manabu Edamura and Logan each do not teach an RF powered showerhead that is electrically isolated. Ameen teaches an RF powered showerhead that is electrically isolated (column 7, lines 9-26, 33-44).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the Ameen RF powered showerhead that is electrically isolated as part of the Manabu Edamura apparatus.

Motivation for implementing the Ameen RF powered showerhead that is electrically isolated as part of the Manabu Edamura apparatus is drawn to a "CVD metallization process that includes a method of cleaning high aspect ratio silicon contacts" (column 3, lines 31-35).

Allowable Subject Matter

11. Claims 14 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. Claim 16 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. USPat. 5,800,618; 6,101,969; 6,197,246; 5,665,166; US2001/0020516; 5,675,471; 5,753,132; 5,846,375; 5,880,924; 5,900,103; 5,280,156; 6,074,518; 6,106,737; 6,391,147; 6,081,414; JP7-130830.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (703) 305-1351. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official after final fax phone number for the 1763 art unit is (703) 872-9311. The official before final fax phone number for the 1763 art unit is (703) 872-9310. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (703) 308-0661. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (703) 308-1633.

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